REMARKS

In view of the following remarks, reconsideration of the rejections contained in the Office Action of July 22, 2008 is respectfully requested.

Applicants would like to thank the Examiner for his courtesy in granting and conducting the telephone interview on October 21, 2008. Specific portions of the interview will be referred to in the following discussion.

On pages 2-3 of the Office Action, the Examiner rejected claims 1-2, 6-8, 10-11 and 14 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. In particular, the Examiner notes that claims 1 and 6 recite "a thin plate-shaped resistive heating element sandwiched and covered by a pair of metal plates" and "a portion of the metal plates extending to an outside of the semiconductor manufacturing device." In this regard, the Examiner indicates that the metal plates correspond to reference numbers 51a and 51b in Fig. 5, and asserts that members 51a and 51b do not extend to the outside. Rather, the Examiner notes that the flange 52 extends to the outside.

However, it is noted that page 19 of the original specification discloses a heating main body 51 formed of an inner shell 51a and an outer shell 51b, and an attaching portion 52 formed of a flange 52a joined to the inner shell 51a and a flange 52b joined to the outer shell 52b. Further, page 18 of the original specification discloses that the attaching portion 52 is formed integrally with the upper end of the heating main body (*i.e.*, flange 52a is formed integrally with inner shell 51a, and flange 52b is formed integrally with outer shell 51b). Thus, claims 1 and 6 recite "a pair of metal plates," and that "a portion of the metal plates" extend to the outside. Further, claims 2 and 7, which depend from claims 1 and 6, respectively, recite that the portion of the metal plates that extends to the outside comprises an attaching portion. However, as the inner shell 51a and the outer shell 51b are disclosed as being formed *integrally* with the flanges 52a and 52b (*i.e.*, the attaching portion), it is respectfully submitted that the limitation of claims 1 and 6 which recites that "a portion of the metal plates" extends to the outside is described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors, at the time the application was filed, had possession of the invention of claims 1 and 6.

Further, the Examiner notes that claim 6 recites that the metal plates are "arranged so as

to detachably cover the inner wall face." In this regard, the Examiner asserts that the specification does not disclose that the metal plates are detachable. Rather, the Examiner asserts that the specification only discloses that the whole heating unit is disclosed as being detachable. In this regard, it is noted that the original specification clearly discloses that the heating unit comprises the metal plates (for example, see pages 18-19 of the original specification). Therefore, as the heating unit is disclosed as being detachable from the processing chamber (as acknowledged by the Examiner), it is respectfully submitted that one of ordinary skill in the art would recognize that the metal plates would also have to be detachable from the processing chamber in order for the heating unit to be detachable from the processing chamber.

Therefore, it is respectfully submitted that claims 1 and 6 clearly comply with the written description requirement of § 112, first paragraph.

On pages 3-8 of the Office Action, the Examiner rejected claims 1-2, 6-7 and 13 under 35 U.S.C. § 103(a) as being unpatentable over Umotoy et al. (US 2001/0054381) in view of Nakamura et al. (US 4,346,285) and Myers et al. (US 4,980,557). On pages 8-9 of the Office Action, the Examiner rejected claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Umotoy in view of Nakamura and Myers, and further in view of Steger et al. (US 5,788,799). Further, on pages 9-10 of the Office Action, the Examiner rejected claim 10 under 35 U.S.C. § 103(a) as being unpatentable over Umotoy in view of Nakamura and Myers, and further in view of Iwabuchi (U.S. 5,755,255). Further, on pages 11-12 of the Office Action, the Examiner rejected claim 11 under 35 U.S.C. § 103(a) as being unpatentable over Umotoy in view of Nakamura and Myers, and further in view of Ohmi et al. (U.S. 2003/0007917). For the reasons discussed below, it is respectfully submitted that the present claims are clearly patentable over the prior art of record.

Independent claim 1 recites a semiconductor manufacturing device which includes a processing chamber, a supply passage for supplying a processing gas to an inside of the processing chamber, a transferring passage through which a wafer is to be put into and taken out of the processing chamber, and an exhaust passage through which the processing gas inside the processing chamber is to be exhausted. The device of claim 1 also includes a sheet-like heating unit arranged to heat an inner wall face of at least one of the supply passage, the transferring

passage, the processing chamber, and the exhaust passage, with the heating unit including a thin plate-shaped resistive heating element sandwiched and covered by a pair of metal plates. Claim 1 also recites that the heating unit is arranged so as to detachably cover the inner wall face from an inner side of the at least one of the supply passage, the transferring passage, the processing chamber and the exhaust passage, and that a portion of the metal plates extend to an outside of the semiconductor manufacturing device. Further, claim 1 recites that *a space between the metal plates in a region of the metal plates which is to be exposed to the processing gas is sealed with a spacer at edges of the metal plates in the region to be exposed to the processing gas,* and that edges of the portion of the metal plates which extends to the outside are open to the outside.

Independent claim 6 recites a heating unit for heating, in a semiconductor manufacturing device, an inner wall face of at least one of a processing chamber, a transferring passage through which a wafer is to be put into and taken out of the processing chamber, and an exhaust passage through which a processing gas inside the processing chamber is to be exhausted. Claim 6 also recites that the heating unit includes a thin plate-shaped resistive heating element and a pair of metal plates that are formed to sandwich and cover the resistive heating element, with the metal plates being arranged so as to detachably cover the inner wall face from an inner side of the at least one of the processing chamber, the transferring passage and the exhaust passage, and so as to define the at least one of the processing chamber, the transferring passage and the exhaust passage. Claim 6 also recites that a portion of the metal plates are arranged to extend to an outside of the semiconductor manufacturing device, *wherein a space between the metal plates in a region of the metal plates which is to be exposed to the processing gas is sealed with a spacer at edges of the metal plates in the region to be exposed to the processing gas,* and wherein edges of the portion of the metal plates which is to extend to the outside are open to the outside.

Umotoy discloses a chemical vapor deposition chamber which, as shown in Fig. 2a, includes a chamber body 250 having an inside heated liner 200. The heated liner 200 includes an embedded resistive heater 215 within the liner 200. However, as acknowledged by the Examiner on pages 4-5 of the Office Action, Umotoy does not disclose *a heating unit which includes a thin plate-shaped resistive heating element and a pair of metal plates that are formed to sandwich and cover the resistive heating element*, as required by independent claims 1 and 6.

Nakamura discloses a heat generating unit 104 which, as shown in Fig. 5, includes a rectangular plate 104a made of a material having a positive temperature coefficient characteristic, and first and second electrodes 104b and 104c deposited on opposite flat surfaces of the plate 104a. Therefore, on page 6 of the Office Action, the Examiner concludes that it would have been obvious to one of ordinary skill in the art to replace the embedded heater 215 of Umotoy with the heat generating unit 104 of Nakamura.

However, as acknowledged by the Examiner on pages 4-5 of the Office Action, none of the Umotoy and Nakamura references discloses a heating unit in which *a space between the metal plates in a region of the metal plates which is to be exposed to the processing gas is sealed with a spacer at edges of the metal plates in the region to be exposed to the processing gas*, as required by independent claims 1 and 6.

Myers discloses a sensor which, as shown in Fig. 1a, includes a heater wire 21 threaded through bores of a ceramic piece 22. Further, Myers discloses that end-loops of the heater wire 21 are protected by a ceramic sealant 23. Thus, on page 6 of the Office Action, the Examiner concludes that it would have been obvious to one of ordinary skill in the art to replace the embedded heater 215 of Umotoy with the heat generating unit 104 of Nakamura, and to use the ceramic sealant 23 of Myers to seal the end of the heater 104 of Nakamura so as to arrive at the invention of independent claims 1 and 6.

However, it is noted that the proposed combination of Umotoy, Nakamura and Myers does not disclose a heating unit including a thin plate-shaped resistive heating element sandwiched and covered by a pair of metal plates in which *a space between the metal plates in a region of the metal plates which is to be exposed to the processing gas is sealed with a spacer at edges of the metal plates in the region to be exposed to the processing gas*, as required by independent claims 1 and 6.

In particular, it is first noted that the proposed combination is the device of Umotoy in which the heater 215 is replaced with the heat generating unit 104 of Nakamura, as indicated by the Examiner on page 6 of the Office Action. Further, on page 5 of the Office Action, the Examiner indicates that the electrodes 104b and 104c of Nakamura correspond to the metal plates of claims 1 and 6. In such a combination, however, the heat generating unit 104 of

Nakamura would be embedded within the liner 200, and therefore no region of the electrodes 104b and 104c of the heat generating unit 104 would be exposed to the processing gas. Thus, the proposed combination of Nakamura and Umotoy would not result in a heating unit in which a space between the metal plates in a region of the metal plates which is to be exposed to the processing gas is sealed with a spacer at edges of the metal plates in the region to be exposed to the processing gas, as required by independent claims 1 and 6.

In response to the argument presented above, during the interview of October 21, 2008, the Examiner indicated that the liner 200 of Umotoy could be interpreted as the plates which sandwich the heating element (*i.e.*, the embedded heat generating unit 104 of Nakamura), and that the liner 200 is exposed to the processing gas. However, it is noted that independent claims 1 and 6 recite "a pair of metal plates," and that Umotoy does not disclose that the liner 200 is comprised of a pair of metal plates. Rather, Umotoy only discloses that the liner 200 is cylindrical, and that the heater 215 is embedded in the liner 200. Thus, Umotoy does not disclose or suggest that the liner 200 comprises a pair of metal plates, and therefore it is respectfully submitted that the alternative interpretation of Umotoy suggested by the Examiner does not disclose the limitations of independent claims 1 and 6 as indicated above.

In addition, it is noted that none of the Umotoy, Nakamura and Myers references discloses a heating unit in which a space between the metal plates is sealed with a spacer at edges of the metal plates. In this regard, it is noted that Umotoy only discloses a heater embedded in the liner 200, and does not disclose a thin plate-shaped resistive heating element sandwiched and covered by a pair of metal plates in which a space between the metal plates in a region of the metal plates which is to be exposed to the processing gas is sealed with a spacer at edges of the metal plates in the region to be exposed to the processing gas, as acknowledged by the Examiner on pages 4-5 of the Office Action.

Further, Nakamura does not disclose a space between the electrodes 104b and 104c, as all of the figures indicate that the ends of the electrodes 104b and 104c are flush with the ends of the plate 104a. Therefore, as Nakamura does not disclose a space between the electrodes 104b and 104c, Nakamura also does not disclose a space which is sealed with a spacer at edges of the metal plates.

In addition, as indicated above, Myers discloses a sensor in which end-loops of the heater wire 21 are protected by a ceramic sealant 23. However, in each embodiment of Myers, the ceramic piece 22 protrudes beyond the layer of sensor material 26, and therefore Myers does not disclose a space between the layers 26 which is sealed by the ceramic sealant 23. Rather, Myers only discloses that the sealant 23 is applied to a space outside of the layers 26. Therefore, as neither of the Nakamura and Myers references discloses a space between the metal layers, the proposed combination of the sealant of Myers with the heating unit of Nakamura does not disclose or suggest a heating unit in which a space between the metal plates is sealed with a spacer, as required by independent claims 1 and 6.

In response to this argument, during the telephone interview of October 21, 2008, the Examiner acknowledged that Nakamura and Myers do not disclose a space between metal plates which is sealed with a spacer. Nevertheless, the Examiner asserted that the application of the sealant of Myers to a space between metal plates at a region which is to be exposed to the processing gas would have been obvious to one of ordinary skill in the art. However, it is first noted that Myers only discloses the sealant 23 being applied to the embodiment shown in Fig. 1a. In the embodiment of Fig. 1a, a single piece of continuous heating wire 21 is threaded through bores in the ceramic piece 22, which results in exposed end-loops of heating wire 21. Thus, Myers discloses that the sealant 23 is applied to the exposed end-loops of heating wire 21. Conversely, Myers discloses that if the heating wire 21 is completely within the ceramic piece 22 (*i.e.*, when there are no exposed end-loops), as shown in Fig. 1b, the ceramic sealant 23 is not needed (column 6, lines 25-27).

Further, as discussed above, Nakamura discloses a thermistor 104 which includes a ceramic plate 104a, and first and second electrodes 104b and 104c deposited on opposite flat surfaces of the plate 104a. Thus, Nakamura does not disclose that the plate 104a includes any heating wire at all, and therefore also does not disclose that the plate 104a includes exposed end-loops of heating wire. Therefore, as Myers discloses that the sealant is only needed when the heating wire is exposed to the measured gasses, Myers does not disclose or suggest applying sealant to the ceramic plate of the thermistor of Nakamura, because the ceramic plate of Nakamura does not include heating wire (and therefore also does not include exposed heating

wire). Thus, it is respectfully submitted that it would not have been obvious to one of ordinary skill in the art based on the teachings of Nakamura and Myers to combine the sealant of Myers with the thermistor of Nakamura.

As indicated above, none of the Umotoy, Nakamura and Myers references discloses a heating unit including a thin plate-shaped resistive heating element sandwiched and covered by a pair of metal plates in which a space between the metal plates in a region of the metal plates which is to be exposed to the processing gas is sealed with a spacer at edges of the metal plates in the region to be exposed to the processing gas, as required by independent claims 1 and 6. Accordingly, the combination of the device of Umotoy with the thermistor of Nakamura and the sealant of Myers also does not disclose or suggest a heating unit including a thin plate-shaped resistive heating element sandwiched and covered by a pair of metal plates in which a space between the metal plates in a region of the metal plates which is to be exposed to the processing gas is sealed with a spacer at edges of the metal plates in the region to be exposed to the processing gas, as required by independent claims 1 and 6.

Therefore, for the reasons presented above, it is believed apparent that the present invention as recited in independent claims 1 and 6 is not disclosed or suggested by the Umotoy reference, the Nakamura reference and the Myers reference taken either individually or in combination. Accordingly, a person having ordinary skill in the art would clearly not have modified the Umotoy reference in view of the Nakamura reference and the Myers reference in such a manner as to result in or otherwise render obvious the present invention of independent claims 1 and 6. It is also noted that the additional references cited by the Examiner do not cure the defects of the Umotoy, Nakamura and Myers references discussed above with respect to independent claims 1 and 6.

Therefore, it is respectfully submitted that independent claims 1 and 6, as well as claims 2-5 and 7-13 which depend therefrom, are clearly allowable over the prior art of record.

In view of the foregoing remarks, it is respectfully submitted that the present application is clearly in condition for allowance. An early notice to that effect is respectfully solicited.

If, after reviewing this response, the Examiner feels there are any issues remaining which must be resolved before the application can be passed to issue, the Examiner is respectfully

requested to contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

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